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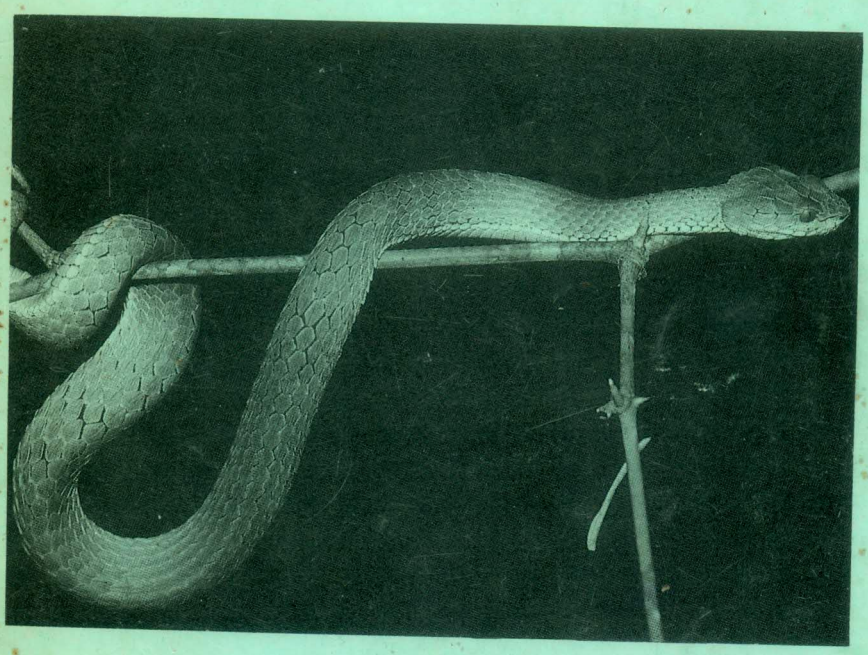

MADRAS SNAKE PARK TRUST

Quarterly Newsletter of the Madras Snake Park Trust

Cover

Largescaled Green Pit Viper (*Trimeresurus macrolepis*)

An elegant snake endemic to the higher hills of the southern Western Ghats. Inhabits cool and moist forests, often remaining motionless on leaves. Venomous, but venom is of low toxicity.

Photo : **R.J Ranjit Daniels**

"It has been truly said that we do not know a species until we know everything about it, its anatomy, its physiology, its development, its habits. The variations in structure in different families and genera, sometimes even in species that are placed in the same genus, have no doubt their interpretation in their varying modes of life, and the correlation of the two is a facinating study. It is one that has been much neglected by the field naturalist. Here is a great field of research waiting for him, for it is upon the living creature that all our theories concerning the function of structure must finally be tested."

- Malcolm A. Smith. (1943)

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CONTENTS

Editorial

Some of the contributors as well as readers have pointed out the printing errors that have appeared in the last issue of *Cobra,* Vol. 23 (January - March, 1996). Although I had introduced an errata where major mistakes were noticed, I must apologise for those which have been overlooked.

On page 39 of the last issue, Shri D.K. Mitra's address has been wrongly cited as " Calcutta Zoological Park", This should instead be Calcutta Snake Park, 31 Hindusthan Park, Calcutta 700 029.

Shri Mitra in a recent letter to me has furnished the following information further to his article entitled ' Shedding of fangs in King cobra' in the last issue. King cobras that shed fangs sprout replacement in 9 days time. These new fangs resemble their original fangs in 3 weeks.

With reference to the note on the cover photograph of the banded krait in the last issue, Sri Mitra has made the following observations:-

Banded kraits inhabit wet habitats. They occupy crab holes. They have never been observed inside termite mounds.

In captivity, they feed on fishes, frogs and white mice besides snakes.

Editor

Biogeography and Taxonomic Uncertainties as Illustrated by Indian Amphibians

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Amongst the South and Southeast Asian countries, India is known for its megadiversity. India is also a privileged country thanks to the nearly 200 years of biological explorations that have been conducted by a number of agencies within its geographical limits. Thus we now have comprehensive lists of vertebrates, flowering plants and, amongst invertebrates, butterflies.

Thanks to our comprehensive knowledge of at least certain groups of animals and plants, we have been able to make biogeographical analysis of the country's biodiversity and identify centres of diversity, endemism and the so-called 'biodiversity hot-spots'. Current understanding of India's biodiversity suggests that, amongst vertebrates, endemism is highest in amphibians and reptiles. It is also interesting that, biogeographically, India has unique regions of high herpetofaunal endemism as the Western Ghats, Eastern Himalayas and Andaman and Nicobar Islands. At a secondary level, India shares certain species, genera and families only with Sri Lanka (eg. amphibian species *Bufo fergusonii, B. microtympanum*; lizard genus *Otocryptis*; snake family *Uropeltidae*). Tertiarily many species, genera and families are typically shared with Indochina and Southeast Asia.

Biodiversity richness, levels of endemism and other biogeographically unique characteristics of any region are easily, nevertheless, influenced by taxonomy and biosystematics. I consider this as a serious problem and wish to briefly discuss it in the context of amphibian diversity and patterns of distribution.

After the first comprehensive list of 181 species of amphibians published for India by Inger and Dutta (1986), the total number has been fluctuating between 190 and 205 species. The revised list of Dutta published in 1992 puts it at 197 after synonymizing or derecognising certain species. While this form of uncertainty is perfectly acceptable, what is more difficult to comprehend is the taxonomic changes that appear in literature off and on.

To startwith, Inger and Dutta (1986) have listed 32 genera of Indian amphibians. After suppressing certain genera and lifting up certain others, Dutta (1992) lists 34. More recent literature on Indian amphibians includes a hitherto unheard of genera *Hoplobatrachus* - neither of the above two sources quote this. I have not kept track of the many other changes that might have appeared and escaped my notice.

Other complications have arisen in maintaining what is endemic. Endemism is valued along a hierarchy. Thus an endemic genera gets more value than a species or subspecies. An endemic family is all the more important. For instance, amongst the amphibians of India, we had a unique genus *Ranixalus* (Inger and Dutta, 1986). This has subsequently disappeared. Whether the endemic genus *Nannobatrachus* be merged with the other endemic genus *Nyctibatrachus*, is not yet probably resolved. In 1992 (Dutta, 1992), genus *Micryletta* appears for the first time in Indian literature (as far as I am aware of). The nearly 10 species in the genus *Indirana* are endemic to either Western or Southwestern India (Dutta, 1992). Is the genus endemic to India ?

Other uncertainties are in the form of unconfirmed identities and distributional ranges. Example may be said of *Rana keralensis*. Since its name-change from *Rana verrucosa* to *R. keralensis*, there have been difficulties in ascertaining its geographical distribution. Although the species is not endemic to Kerala but widespread over South and Southwestern India (Daniels, 1992) its occurrence in West Bengal (Deuti and Goswami 1995) and Andamans (Pillai, 1991) need verification. Further, *Bufo camortensis* of the Andaman and Nicobar Islands is posing difficulty (Mansukhani and Sarkar, 1990). Whether it should be regarded as *B. spinipes* (Crombe, 1986) or not is still a debate. More recent doubts

raised about its sympatry (presumably) with *B. melanostictus* on the islands need clarification (Abdulali, 1982 ; Sekar, 1984; Das, 1995). However, the individuals that I collected in the Great Nicobar Island recently are clearly distinct from *B. melanostictus* as the parietal ridges definitely are turned inwards more like *B. parietalis* and *B. fergusonii* (Pillai, 1991). Incidentally, the toads that I heard calling at Campbell Bay (GNI) were not different from the *B. melanostictus* of the mainland India.

A third case of distributional uncertainty is that of *Polypedates cruciger* in Southwestern India. I first collected this from the southern tip of the Western Ghats and wrote about it (Daniels and Ravichandran, 1995). Subsequent examples were found in Anamalai Hills and up to southwestern Karnataka. It is however debated by both colleagues in India as well as Sri Lanka, that what I have identified is not probably *P. cruciger*. To complicate matters further, I have in my collection an adult tree frog sent from the Great Nicobar Island which appears to be close to both *P. cruciger* and *P. eques*, both species considered endemic to Sri Lanka.

Many examples of unconfirmed identity of amphibian species in India can be quoted. This is, however, not the purpose of this discussion. The issue is to propose means of overcoming these hurdles while presenting meaningful biogeographical analysis.

The Convention on Biological Diversity that has come into force since December 1993 emphasises that a nation's biodiversity is its sovereign asset. Unique patterns of distribution, endemism, etc., are to be identified and protected for future study and sustainable development. As is evident, a greater value is being placed on endemic forms of biodiversity than on that which are shared between nations. Shared biodiversity nevertheless requires co-operation between nations for successful management. For a critical analyses of biogeographical patterns statistical weights are used. Such weights are often in the form of number of species within a genus or number of genera within a family endemic to the region under concern. Taxonomy and biosystematics are together critical in this context.

Placing higher values on greater levels of biodiversity and endemism, has also its dangers. Although traditionally biosystematists have

gone by certain external characteristics, behaviour, ecology and reproductive abilities to identify unique species, modern biologists have resorted to phylogenetic species classification. This in turn has unduly magnified the total numbers of species and has already been criticised as dangerous and unexpected, at least in the case of birds (Martin, 1996). While this approach remains a threat to amphibian biosystematics, a subtler evil is that of taxonomists within India and abroad working in isolation trying to rename species or identify newer forms. It is therefore important that we develop a common forum within which there is better interaction and co-ordination. Especially in the light of modern advancement though the electronic media, such fora should be viable. Easily accessible literature, type specimens and expertise should be what such fora can build locally for the South Asian region.

Acknowledgement :

My work on amphibians in the Western Ghats and Andaman and Nicobar Islands has been supported by the Ministry of Environment and Forests, Government of India. The co-operation of the State Forest Departments of Kerala, Tamilnadu, Karnataka and the Andaman and Nicobar Islands is acknowledged.

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Survey of Reptilian fauna of Parambikulam Wildlife Sanctuary, Kerala.

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The present account is mainly based on the studies carried out by the author on a reptilian collection obtined from the Parambikulam Wildlife Sanctuary during faunistic surveys conducted recently. The reptilian fauna of the conservation area appears to be not well documented in literature. Smith (1933, 1935,1943) mentions only the occurence of *Ristella bedommi* Boulenger (Family : Scincidae) from Parambikulam. Yet another species, *Uropeltis nitidus* Boulenger (Family : Uropeltidae) mentioned by Smith (1943) from the Cochin side of Anamalai hills can also be considered belonging to the present day Parambikulam Sanctuary area. However, some of the several species of reptiles dealt by Smith (1935,1943) from the adjacent Anamalais can be expected to overlap in distribution with some areas of the Parambikulam Santuary.

The material collected during the surveys are deposited in the faunal holdings of the Zoological Survey of India, Calicut. The nomenclature followed in this account is after Murthy (1994).

Study Area

The Parambikulam Wildlife Sanctuary located at 10°20' N - 10° 32' N latitude and 76° 35' E -76° 51' E longitude covers an area of 285 sq.km in the Palakkad (Palghat) district of Kerala state. It is contiguous with the eastern Anamalai Indira Gandhi Wildlife Sanctuary of Tamil Nadu . The Parambikulam Sanctuary notified in 1973 has 4 forest ranges namely, Sungam, Parambikulam, Karimala and Orukomban. The dominant vegetaion that occurs in the Parambikulam valley and surrounding hills belongs to the west coast tropical evergreen and semi-evergreen types besides extensive teak plantations. The Parambikulam basin drains towards south and west through the Chalakkudi river.

Systematic Account

Class : Reptilia
Order : Testudines

Family : Emydidae

1. *Geomyda silvatica* (Henderson)
   Material : 1ex. *Loc.*:Pezhakunnu. *Date*:4-xi-1995.*coll.*: P.M.Sureshan & party.

2. *Melanochelys trijuga* (Schweigger)
   Material : 2 exs. *Loc.*: Thellickal. *Date*:15-iii-1996.*coll.*: C.Radhakrishnan & party.

Family : Testudinidae

3. *Indotestudo forstenii* (Boulenger)
   Material : 1 ex. *Loc.*:Venkoli. *Date*: 27-x-1995. *coll.*: P.M.Sureshan & party

Order : Squamata
Suboarder : Sauria
Family : Gekkonidae

4 . *Cnemaspis wynadensis* (Beddome)
   Material : 1 ex. *Loc.*:Venkoli. *Date*:27-x-1995. *coll.* : P.M.Sureshan & party.

Family : Agamidae

5. *Calotes calotes* Linnaeus
   Material : 1 ex. *Loc.*: Cheechali. *Date*: 14-iii -1996. *coll.*: C.Radhakrishan & party.

6. *Calotes elliotti* - Gunther
   Material : 1ex.*Loc.*: Pezhakunnu. *Date*:4-xi-1995.*coll.*: P.M.Sureshan & party.

7. *Calotes rouxii* - Dumeral & Bibron
   Material : 13exs.*Loc.*:Padippara,towards Sarkarpathy tunnel,

Kamathalachi,Pulikal R.F., Muthuvarachal,Muduvan's colony, Orumkomban. *Dates* : 28-x-1995, 30-x-1995,1-xi-1995,5-xi-1995,17-iii-1996, 19-iii-1996. *coll.*: P.M.Sureshan & party and C.Radhakrishan & party.

8. *Calotes versicolor* (Daudin)
   Material : 1 ex.*Loc.*:Muthalakayam. *Date*:6-xi-1995.*coll.*: P.M.Sureshan & party

9. *Psammophilus dorsalis* (Gray)
   Material : 7 exs.*Loc.*:Venkoli,Padippara,Pulikal R.F. *Dates*:27-x-1995,28-x-1995,1-x1-1995.*coll.*: P.M.Sureshan & party.

Family : Scincidae

10. *Mabuya macularia* (Blyth)
   Material : 3 exs.*Loc.*:Padippara,Muthalakayam. *Dates*:28-x-1995, 6-xi-1995.*coll.*:P.M.Sureshan & party

11. *Riopa punctata* (Gmelin)
   Material : 1ex.*Loc.*: towards Sarkarpathy tunnel. *Date*:29-x-1995,*coll.*: P.M.Sureshan & party.

12. *Ristella beddomii* Boulenger
   Material : 1ex.*Loc.*:Muthalakayam. *Date*:6-xi-1995.coll.: P.M.Sureshan & party.

13. *Sphenomorphus dussumieri* (Dumeril & Bibron)
   Material : 1 ex.*Loc.*:Orukomban. *Date* : 20-iii-1996. *Coll.*: C.Radhakrishnan & party.

Sub Order : Serpentes (Ophidia)
Family : Colubridae

14. *Ahaetulla nasuta* (Lacepede)
   Material : 1ex.*Loc.*:Anchupoola. *Date*:31-x-1995.*coll.*: P.M.Sureshan& party.

15. *Amphiesma beddomei* (Gunther)
   Materia : 1ex.*Loc.*:Muthalakayam. *Date*:6-xi-1995.*coll.*: P.M.Sureshan & party.

16. *Amphiesma monticola* (Jerdon)
Material : 1ex.*Loc.*:Orukomban. *Date*:3-xi-1995.*coll.*: P.M.Sureshan & party.

17. *Dendrelaphis grandoculis* (Boulenger)
Material : 1ex.*Loc.*:Pulikal R.F. *Date*:1-xi-1995.*coll.*: P.M.Sureshan&party.

18. *Dendrelaphis tristis* (Daudin)
Material : 1ex.*Loc.*:Karienchola. *Date*:14-iii-1996.*coll*: C.Radhakrishnan& party.

19. *Elaphe helena* (Daudin)
Material : 1ex.*Loc.*:Anchupoola. *Date*:31-x-1995.*coll.*: P.M.Sureshan& party

20. *Oligodon affinis* (Gunther)
Material : 1ex.*Loc.*:Kamathalachi. *Date*:30-x-1995.*coll.*: P.M.Sureshan& party.

21. *Xenochropis piscator* (Schneider)
Material : 2exs.*Loc.*:towards Sarkarpathy tunnel. *Date*:30-x-1995.*coll.*: P.M.Sureshan& party.

Family : Viperidae

22. *Hypnale hypnale* (Merrem)
Material : 5exs.*Loc.*:Kamathalachi.Pulikal R.F.Thunakadavu, Pezhakunnu, Muthuvarachal. *Dates* : 30-x-1995,2-xi-1995,5-xi-1995. *coll.*: P.M.Sureshan&party.

23. *Trimeresurus malabaricus* (Jerdon)
Material : 2 exs.*Loc.*: Anchupoola, Pulikal R.F. *Date* : 31-x-1995. *coll.*: P.M.Sureshan & party.

Additional List of reptiles From Parambikulam Sanctuary

Apart from the 23 species of reptiles reported above, the management plan for the Pramabikulam Wildlife Sanctuary (Unniyal, 1990) provides the following list of snakes occuring in the sanctuary.

Family : Typhlopidae

1. *Ramphotyphlops braminus* (Daudin)
Family : Uropeltidae
2. *Plectrurus perroteti* Dumeril
Family : Boidae
3. *Eryx conicus* (Schneider)
4. *Python molurus* (Linnaeus)
Family : Colubridae
5. *Atretium schistosum* (Daudin)
6. *Lycodon aulicus* (Linnaeus)
7. *Macropisthodon plumbicolor* (Cantor)
8. *Ptyas mucosus* (Linnaeus)
Family : Elapidae
9. *Bangarus caeruleus* (Schneider)
10. *Naja naja* (Linnaeus)
11. *Ophiophagus hannah* (Cantor)
Family : Viperidae
12. *Echis carinatus* (Schneider)
13. *Trimeresurus gramineus* (Shaw)
14. *Vipera russelli* (Shaw)

A recent photograph that appeared in the news paper "The Hindu" (April 8, 1996) shows the Golden flying snake, *Chrysopelia ornata* (Shaw) Family : Colubridae) feeding on a garden lizard in the Parambikulam Wildlife Sanctuary.

As mentioned above, Smith's report of *Uropeltis nitidus* Boulenger can also be considered relevant to the Parambikulam Sanctuary.

Acknowledgement :

The author is grateful to the director, Zoological Survey of India, Calcutta for facilities and encouragement and to the officials of the Forest Department, Government of Kerala for the help and cooperation rendered during the surveys.

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Cobra invites articles and short notes on reptiles and amphibians, their ecology, biology, natural history, conservation or other aspects. These may be of scientific or popular interest. Black and white photographs are also welcome.

Please send your contribution to the Editor, Cobra, Madras Snake Park Trust, Rajbhavan Post, Madras 600 022.

Captive Breeding of Reptiles at the Madras Snake Park

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The breeding in captivity of endangered species of animals is crucial to the survival of many rare species. It has turned out to be a method of preventing extinction. This is the reason why captive breeding, sometimes called "wild life survival breeding", has become unavoidable.

India has a rich heritage of wildlife composed of about 500 species of mammals 1200 species of birds and 500 species of reptiles, of which 40 species of mammals, 20 species of birds and 12 species of reptiles are considered to be endangered.

Exploitation of reptilian resources in India is chiefly for flesh and eggs as food, hide, skin and shell for fancy leather articles and handicrafts, teeth and bones as charms, fat for its alleged, medicinal properties and venom for prepration of medicinal products.

The Government of India and other organisations like IUCN, WWF, and FAO have initiated the project of captive breeding in Zoos, to conserve the endangered species. The major aim of captive breeding is to breed sufficient number of animals to make a viable population to re-establish in former wildlife habitats.

Objectives of captive breeding programme :

1. Captive breeding programme is attempted in many zoos to replace their own stock.
2. Captive breeding is attempted to establish a viable stock of endan gered species.

3. If sufficient numbers are bred in captivity, then we can reintroduce them into the wild habitat to conserve the endangered species.

Precautions to be adopted :

1. Avoid cross breeding. If cross bred, the genetic material will be pol luted. This might lead to changes in taxonomical status.
2. Avoid inbreeding.
3. Maintain pure bred genetic variety.
4. If no such pure bred variety is available, necessary steps should be initiated for breeding from other zoos.
5. Captive stock should be released after extensive scientific study in their wild habitat.

The Madras Snake Park has been engaged in captive breeding programmes and has a fairly good captive breeding record for various reptile species. The following species were successfully bred in the Snake park.

Python molurus

It was kept in a large cage. Mating was observed on 2nd May 1989. The gestation period was 37 days. 3 eggs hatched on 7th August, and 4 eggs hatched on 10th August. 3 were infertile. 4 eggs were found with dead embryo. Incubation period was 61 days. Total hatching success was 50%.

Python reticulatus

It was kept in a large cage. Mating was observed on 25th January 1990. The gestation period was 76 days. The female laid 39 eggs, 6 of which were infertile. On 18th July 1990, i.e. on 99th day, 11 hatchlings were seen. 21 had dead embryos and 1 was sacrificed for dissection. Hatching success was 28%.

Melanochelys trijuga

The Pond turtles were kept in the open enclosure. No courtship and mating were observed among the group. On 14th December 1991 a female laid 6 eggs. All the eggs hatched on 2nd July 1992. The incubation period was 199 days. 100% hatching success was observed.

Crocodylus palustris

Marsh crocodiles were kept in the open enclosure. Mating was not observed. On 12th April 1992 a female crocodile laid 38 eggs. After 54 days, on 6th June 1992, 28 eggs hatched. Remaing 6 were infertile and 4 eggs were found with dead embryos.

Chameleon zeylanicus

They were kept in the closed enclosure. Mating was not observed. 24 eggs were laid on 14th December. Hatchlings emerged on 20 July 1992. Out of 24 numbers, all the 24 hatched. The gestation period was 217 days.

Vipera russelli

Although mating was not noticed, on 13th June 1992, the female gave birth to 20 young ones.

Eryx conicus

Mating was not observed. On 16th June 1992 the female gave birth to 12 young ones. Fed on earth worms, all of them are in good condition.

Treatment of Necrotic Stomatitis in Indian Python

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Necrotic stomatitis or mouth rot or mouth canker is inflammation of oral cavity characterised by the formation of necrotic debris. Mouth rot has been widely reported in European and American species. The etiology of mouth lesions, and upper alimentary tract is uncertain, though it is well recognised that trauma of lips and rostrum during capture and engulf of its prey and persistant attack and damaging itself on the glass of enclosure are reasons in captivity. A similar condition may also arise in the mouth of snakes used for venom extraction. Another cause may be the defeciency of vitamin A or vitamin C in captivity (i).

Case history and clinical examination :

An Indian Python (*Python molurus*) 18' length weighing 25 kgs, was presented to the Arignar Anna Zoological Park, Vandalur on 15 th October 1988 from Gudalore Forest Division with partly engulfed Barking deer in its mouth. The prey might have been taken 12 hours before its arrival here. The prey from its mouth was removed manually. The Python was subjected to thorough clinical examination of oral cavity and it was found that the attachment of tissues at the lower and upper jaw were observed to be torn to some extent resulting in difficulty for the Python to close its mouth fully. Few lacerated injuries were also noticed on both upper and lower gums with necrotic debris on the lateral aspect of lips.

Treatment :

After securing the Python with one person at the neck region and one at the tail region on the dorsal recumbency, the mouth was washed with 1 %

Cetrimide lotion (ii). The soiled necrotic tissues were removed, once again irrigated with 1 % Cetrimide lotion and dressed with Boro- glycerine daily for 5 days. Result with Boro-glycerine dressing was not satisfactory. Terramycin liquid was used for dressing the injuries with one course of injection. Oxytetracyclin 2 ml,(daily intramuscularly) was administered at the ventral aspects of base of tail region for five days. During the course the Python was force fed with small rats totally weighing 750 gms and small pieces of beef weighing 1 kg at an interval of 7 days.

After the course of Parental Antibiotics, 5 gms of Bacterisol powder was being given along with 1 lt. of water daily. The debris formed during the progress of healing were removed and dressed with Terramycin liquid on alternate days. The Python was given 1ml. of injection Prepalin forte on three occasions in alternate days at the base of tail region as a supportive therapy. After 35 days the mouth lesions healed completely and the Python was able to take a whole rabbit weighing 3.5 kg without any assistance.

Acknowledgement :

The authors are grateful to Thiru S. Subbarayalu Naidu, IFS., the then-Director of Aringnar Anna Zoological Park, Vandalur for providing necessary facilities.

Reference :

i. International Zoo Year Book, Volume - 13 - Page No. 268, 269.

ii. J.E. Cooper and O.F. Jackson, Diseases of Reptilia Vol. I - page No. 175 - 176.

Amphibians of India : Some more species

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Inger and Dutta (1986) published the first list of Indian amphibians which comprised of 181 species. Chanda & Ghosh (1988) added 13 more species to this list but 10 of their catalogued species were synonymous with the ones already listed by Inger and Dutta. Das (1990) however added 11 more species to this list. Subsequently Dutta (1992) modified the earlier list by Inger and Dutta through addition and omission of some species, thus increasing the compilation to 197 species. In spite of all this some species have been overlooked and needs to be appended to the list of amphibians known from within the political boundaries of the Republic of India. Besides, two more species also have been described since 1992. The present paper therefore is an addenda to the amphibians of India. With the inclusion of eight more species, the number of amphibians known from India is 205.

Family: Pelobatidae

1. *Leptobrachium hasselti* Tschudi, 1838
   Type locality : Java, Indonesia
   Distribution in India : Meghalaya

Family : Bufonidae

2. *Ansonia kamblei* Ravichandran and Pillai, 1990
   Type locality : Jeur, 29 kms north of Tembhurni, Karnala, Sholapur district, Maharashtra
   Distribution in India : Maharashtra (known from type locality only)

3. *Bufo viridis* Laurenti, 1768
   Type locality : Vienna, Australia
   Distribution in India : Jammu and Kashmir

Family: Ranidae

4. *Limnonectes shompenorum* Das, 1996
   Type locality : Shompen hut, Great Nicobar Island
   Distribution in India : Great Nicobar (known from type locality only)

5. *Micrixalus gadgili* Pillai and Pattabiraman, 1990
   Type locality : Dynamite house, Pamba, Sabarigiri forest, Kerala
   Distribution in India : Kerala (known from type locality only)

6. *Rana chalconata* (Schlegel 1837)
   Type locality : Java, Indonesia
   Distribution in India : Great Nicobar Island

Family: Rhacophoridae

7. *Polypedates insularis* Das, 1995
   Type locality: 2 kms east of mouth of Galathea river, Galathea National Park, Great Nicobar
   Distribution in India: Great Nicobar

8. *Rhacophorus reinwardtii* (Schlegel 1840)
   Type locality : Java, Indonesia
   Distribution in India : Meghalaya, Arunachal Pradesh and West Bengal

Acknowledgements :

I am grateful to S.K. Chanda and M.S. Ravichandran of ZSI and to Indraneil Das of Madras Crocodile Bank for Literature sent and to R.J. Ranjit Daniels for research facilities.

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Random Harvest

Snake's Diet and Venom

There are considerable variations in the composition of snake venom even within the same species depending on geographical distribution. It is important to note this since it may have a relevance to snake bite symptoms and implications to snake-bite therapy. In a letter to *Nature*, 8 th Feb. '96, Jennifer C. Daltry, Wolfgang Wuster and Roger S. Thorpe analyse the possible cause of this phenomenon based on tests conducted on the Malayan Pit Viper *Calloselasma rhodostoma*, 67 specimens of which were collected from 36 localities in Vietnam, Thailand, Malaysia and Indonesia. Since the primary function of viperid venom is to immobilize and digest prey and since prey taxa vary markedly in their susceptibility to venom, the authors suggest that geographical variations in venom composition reflect natural selection of prey in the particular locations. In other words, different *C. rhodostoma* populations produce venoms appropriate for subduing and digesting local diet.

They also found that venoms of captive bred *C. rhodostoma* produce electrophoretic profiles similar to those of wild specimens from the same locality as their parents in spite of their unnatural diet in captivity. This indicates that the venom/prey association is inherited rather than environmentally induced and that venom composition is under strict genetic control.

Salmonella poisoning

A report in *The Monitor* (Newsletter of the Hoosier Herpetological Society) of March 96 reprinted from *The Indianopolis Star* of 2.2.96 refers to a case of forty people being stricken with a rare, particularly virulent type of Salmonella bacteria after visiting the Denver Zoo. Some of the victims had stroked one of the larger lizards while others had simply touched the wooden enclosure.

The attention of the readers is invited also to the entry under " Zoonoses" in Random Harvest in the *Cobra* Volume 18.

Face to Face

Genuine accounts of encounters with the king cobra in the wild are rare to come by. Therefore, the following account in the course of an article on the Rajaji National Park, Uttar Pradesh, which appeared in *Sanctuary* (1991 XI : 14 - 25) will be of interest. The author is the well known wildlife biologist Dr. A.J.T. Johnsingh, now Jt. Director, Wildlife Institute of India, Dehradun.

"While walking through a patch of tall grass, I suddenly discovered a large snake sliding through the grass right next to me. My immediate reaction was alarm and while making good my escape I was able to identify the reptile. It was a king cobra ! My naturalist's curiosity prompted me to pause behind a *Mallotus* tree and try to locate the snake once more. To my horror, I saw it coming straight towards me. It stopped 3-4 metres away from me, raised its hood and retracted its body to form 3 coils. In a typical awe-inspiring threat display, the cobra opened its flesh-red mouth and lunged towards me. Although the snake was over three metres long, its forward plunge fell short of where I stood. I too instinctively jumped back. The snake did not persist in its attack. It swiftly turned back and disappeared in the tall grass. I have now studied the wildlife of Rajaji National Park for over six years and experienced several memorable encounters. This encounter with the king cobra was one of the most unforgettable".

Wanted : An Exit Policy for Sea Turtles

A report in *India Today* of June 15, 1996 says that an estimated 10,000 olive ridley, leatherback, hawksbill and loggerhead sea turtles, all threatened species, are inadvertently caught in the shrimp trawlers in the Bay of Bengal. A turtle excluder device, an exit port on a trawler net that allows turtles to escape, should cost only between Rs. 500 and 1000 per trawler. But the efforts of the Ministries of Environment and Agriculture to make trawlers adopt this measure have not so far been successful. The Report hopes that the announcement by the U.S. of a ban on shrimp imports from countries that do not protect endangered sea turtles might now force the trawler operators to change their ways.

Electrostatic sense in snakes

Do the tongues of snakes have functions other than smell ? There has been some interesting correspondence in *Nature* on the role of the tongue in snakes as a receptor of electrostatic sense. In the 21 st July 1994 issue, W.T. Vonstille and W.T. Stille advance the hypothesis that snakes sense the presence of cover and other environmental features by perceiving electrostatic effects through tongue-scanning.

In *Nature* of 5 th January 1995, Kurt Schwenk and Harry W. Greene dispute this hypothesis and maintain that tongue-flicking can be explained exclusively as a vomero-nasal function. In a rejoinder to this in the same issue, Vonstille and Stille stick to their guns.

B.Vijayaraghavan

"..... skill in making acknowledgments is the hallmark of the thoroughbred scholar. It can sometimes happen that a scholar, his task completed, discovers that he has no one to thank. Never mind. He will invent some debts. Research without indebtedness is suspect, and somebody must always, somehow, be thanked."

Umberto Eco.

MADRAS SNAKE PARK TRUST

ANNUAL REPORT 1995 - 96

During the year 1995 - 96, Mr. B. Vijayaraghavan and Dr. R. J. Ranjit Daniels continued as Chairman and Hon. Secretary respectively. Mr. M. Krishnan and Mr. P. Kannan ceased to be trustees with effect from 7.6.95. and 6.10.95 respectively. Dr.T.Sundaramoorthy was elected as trustee on 12.8.95. Mr. P. V. Laxminarayana was reelected as trustee on 2.3.96. Mr. P. Prakasam, Wildlife Warden, Madras, ceased to be *ex officio* trustee on 15.6.95 consequent on his transfer and his successor Dr. S. Paulraj became *ex officio* trustee on 15.6.95.

2. Mr.V. Kalaiarasan continued as Director during the year.

3. The Central Zoo Authority granted recognition to the Madras Snake Park under section 38 (H) of the Indian Wildlife (Protection) Act.1972 in their letter dt. 4.4.95.

4. The aquarium for sea snakes and fresh water turtles constructed at a cost of Rs. 1.5 lakhs during the close of the previous year with 50 % grant from the Central Zoo Authority was thrown open to the public on 29.4.95.

5. A terrarium with glass-fronted cages to house poisonous snakes was constructed during the year at a cost of Rs. 1,54,331/- of which half the amount was received as grant from the Central Zoo Authority. This was thrown open to the public on 22.10.95.

6. A toilet block was constructed at a cost of Rs. 99,467/-.

7. The entire electrical installations were taken up for modifications and renewals during the close of the year.

8. Fire extinguishers were installed at various strategic points.

9. The counter for sale of publicity materials was redesigned.

10. As a measure of public education, the Park made arrangements for sale to the public of popular scientific literature on reptiles. Nearly 400 copies of such publications were sold to the public from November '95 to March '96.

11. Reptile picture postcards in colour (a set of ten) were printed and made available for sale to the public. New stickers showing the logo of the Madras Snake Park Trust were also printed and sold to the public.

12. Over the years, the Snake Park had come to possess a large collection of preserved specimens of reptiles, some of which being uncommon species. With a view to make these available to the more serious-minded visitors, particularly students of Zoology, storage-cum-display cabinets were constructed at a cost of Rs. 84,250/- and the specimens displayed with details of their common and scientific names. This was thrown open to the public on 10.4.95. Fifty percent of this expenditure was received as grant from the Central Zoo Authority.

13. Display boards giving detailed popular scientific information on reptiles in English and Tamil were erected at various points in the Park at a cost of Rs. 11,320/- in order to promote public education on reptiles.

14. Indian python and reticulated python from the surplus stock available with the Snake Park were supplied to the Madras Crocodile Bank. In exchange, the Snake Park received from the Crocodile Bank, Morelett's crocodile, spectacled cayman, salt water crocodile, water monitor, iguana, Siamese crocodile and African dwarf crocodile. One reticulated python was supplied to the Aringer Anna Zoological Park, Madras.

15. During the year, Indian soft shell turtle, Madras pond turtle, Indian python, reticulated python, olive keelback, bronze-back tree snake and green vine-snake bred in the Park.

16. At the close of the year, the Snake Park had on display seven species of crocodiles, four species of turtles/tortoises, four species of lizards and twentyeight species of snakes, a total of fortythree reptile species. A detailed list is annexed. This is the highest stock of species the Snake Park has had since its inception in 1972.

17. Animal keepers of the Snake Park attended a one-day workshop organized by the C.P.R. Environmental Education Centre, Madras on 6.5.96.

18. All four issues of the quarterly journal *Cobra* due in the year have been published.

19. As stipulated by the Central Zoo Authority while granting recognition to the Madras Snake Park, one day in the week (Tuesday) has been declared as holiday with effect from June '95. Consequently, the Snake Park lost 39 visitor days in the year with corresponding reduction in receipts.

20. During the year, 7,10,849 visitors (5,42,210 adults and 1,68,639 children) visited the Park.

21. The total income for the year was Rs. 14,98,612/- and the expenditure Rs. 14,97,728/-.

22. The Madras Snake Park Trust is grateful to the Government of Tamil Nadu in the Environment and Forest Department, the Chief Wildlife Warden, Tamil Nadu, the Madras Crocodile Bank and the Central Zoo Authority of India for all the encouragement and support.

B. Vijayaraghavan
Chairman
(For and on behalf of the Board of Trustees.)

Annexure to Annual Report 1995 - 96

REPTILE SPECIES ON DISPLAY AT THE MADRAS SNAKE PARK
(As on 31. 03. 96)

1.	Marsh crocodile	(*Crocodylus palustris*)
2.	Gharial	(*Gavialis gangeticus*)
3.	Saltwater crocodile	(*Crocodylus porosus*)
4.	Morelett's crocodile	(*Crocodylus moreletti*)
5.	Spectacled cayman	(*Caiman crocodilus*)
6.	Siamese crocodile	(*Crocodylus siamensis*)
7.	African dwarf crocodile	(*Osteolaemus tetraspis*)
8.	Indian soft-shell turtle	(*Lissemys punctata*)
9.	Pond turtle	(*Melanochelys trijuga*)
10.	Aldabra tortoise	(*Geochelone gigantea*)
11.	Star tortoise	(*Geochelone elegans*)
12.	Common monitor	(*Varanus bengalensis*)
13.	Water monitor	(*Varanus salvator*)
14.	Chameleon	(*Chamaeleon zeylanicus*)
15.	Green iguana	(*Iguana iguana*)
16.	Common cobra	(*Naja naja*)
17.	Black cobra	(*Naja naja oxiana*)
18.	Common krait	(*Bungarus caeruleus*)
19.	Russell's viper	(*Vipera russellii*)
20.	Saw-scaled viper	(*Echis carinatus*)
21.	Pit viper	(*Trimeresurus sp.*)
22.	Rat snake	(*Ptyas mucosus*)
23.	Green vine snake	(*Ahaetulla nasutus*)
24.	Bronze-back tree snake	(*Dendrelaphis tristis*)
25.	Flying snake	(*Chrysopelea ornata*)

26.	Banded racer	(*Argyrogena sp.*)
27.	Trinket snake	(*Elaphe helena*)
28.	Kukri snake	(*Oligodon sp.*)
29.	Wolf snake	(*Lycodon aulicus*)
30.	Cat snake	(*Boiga trigonata*)
31.	Checkered keel-back	(*Xenochropis piscator*)
32.	Olive keel-back	(*Atretium schistosusm*)
33.	Striped keel-back	(*Amphiesma stolata*)
34.	Green keel-back	(*Macropisthodon plumbicolor*)
35.	Common sand boa	(*Eryx conicus*)
36.	Red sand boa	(*Eryx johnii*)
37.	Indian python	(*Python molurus*)
38.	Reticulated python	(*Python reticulatus*)
39.	Dog-faced water snake	(*Cerberus rhynchops*)
40.	Annulated sea snake	(*Hydrophis cyanocinctus*)
41.	Yellow sea snake	(*Hydrophis spiralis*)
42.	Hook-nosed sea snake	(*Enhydrina schistosa*)
43.	Narrow- headed sea snake	(*Microcephalophis gracilis*)

❖ ❖ ❖ ❖ ❖

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AIMS AND OBJECTIVES OF

MADRAS SNAKE PARK TRUST

i) To maintain and display a captive collection of snakes and other reptiles as a means of education of the public.

ii) To promote knowledge on snakes and other reptiles and dispel the erroneous beliefs about them.

iii) To undertake captive breeding of vulnerable species of snakes and other reptiles.

iv) To aid and assist research in herpetology.

v) To provide facilities for the identification and classification of snakes and other reptiles and, for this purpose, maintain a museum of study collections.

vi) To maintain a library of books and other literature on herpetology.

vii) To publish scientific and semi- scientific literature on snakes and other reptiles.

viii) To undertake survey on the distribution and status of snakes and other reptiles.

ix) To provide consultancy services on snakes and other reptiles.

x) To provide a common forum for amateur herpetologists to interact.